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ABSTRACT

This paper is an attempt by James G. Miller to apply the concepts of a general systems theory to increase the understanding of the educational process. He classifies the elements of the educational process into levels of living systems: the organism level--student, parent, teacher, etc.; the group level--the class in the classroom; the organization level--the schools, colleges and universities; the society level--the national education system; and the supranational level, as in UNESCO. Each of these levels is discussed in terms of a systems theory. (GO)

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THE LIVING SYSTEMS INVOLVED IN THE EDUCATIONAL PROCESS

by James G. Miller*

How can the concepts of general systems theory** be applied to increase understanding of the educational process? A number of levels of living systems are involved: At the organism level, there are several sorts of persons: the student, the parent, the teacher, the administrator, and other employees of educational institutions. At the group level: the class in the classroom, or the teacher and student in a tutorial session. At the organization level: in primary and secondary eduction, the school, and at a higher echelon, the school system; also in higher education, the college or university, and at a higher echelon, the statewide agency which coordinates higher education. At the society level: the national educational system, which has little centralized control in the United States but is much more centralized in the Soviet Union and elsewhere. Finally, at the supranational level; UNESCO, the Economic and Social Council of the United Nations, and other activities, are producing the first glimmerings of international coordination of education.

We shall now discuss in turn each of these levels of living systems involved in education, applying the concepts outlined in the previous paper.

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** Cf. the first paper of this series: Miller, J. G., The nature of living systems. An exposition of the basic concepts in general systems theory. November, 1968.

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The Persons in the Educational Process

The central person in all of education is the student. During the time he is in school the needs of his matter-energy processing subsystems must be provided for--milk and lunches for his ingestor; clothes and heat to warm all his subsystems; lavatories for his extruder; walks, hallways, and exercise facilities for his motor. There must be facilities for his information processing subsystems as well--lectures and artifacts such as books, television, computerized programmed instruction, and audiovisual aids for his input transducer; language teachers and language laboratories for his decoder and encoder; learning aids and tutorial assistants for his associator; academic advisers and counselors on personal problems for his decider; auditoriums and speech laboratories for his output transducer.

Students are of different types--male and female, all races, and many genetic strains. Their different physical, mental, and emotional characteristics mean that they have various needs which require individualized attention. Being human, students have highly complex nervous systems, decisions being made at several neural echelons, from the local adjustment processes of the spinal cord up to the subtlest creative processes of the cortex of the brain. As he matures each student must learn from his parents and teachers how to govern or control (a) his subsystems and components, his viscera and other organs (Freud used the term "id" to refer to such governance and the emotions related to it); (b) his entire system (Freud's "ego"); and (c) his system in relation to other persons in his suprasystem (Freud's "superego".) He must also learn how to use the common as well as the new and sophisticated

artifacts which are becoming more and more important in our modern technological society. No education deals with the whole student unless it relates to his mental, emotional, physical, social, cultural, and technological adjustments.

Education is primarily an information processing activity of the student, involving many, and often repeated, information inputs to him and outputs from him as well as much internal processing in his nervous system. Thus he learns to use language, think, solve problems, make decisions, and adjust to the threats and stresses of life. Education involves learning many facts but it is more important for the student to discover where to find facts and how to make the adjustments required by a wide range of threats and stresses. One of the things that every educated person must learn, in one set of terms or another, is that adjustments are more adaptive if they are continually subjected to checks in order to discover whether they are optimally achieving their goals. This is accomplished by using negative feedbacks. A soprano checks her tones by playing back a tape recording she has just made. A student checks his progress by the monthly grades on his report card and, if he is motivated, works harder in those classes where he got the lowest grades. An athlete considers his previous year's batting average in deciding whether to try to make the baseball team again this year.

As they grow up students learn about power--how to influence others to do what they want of them. This is a fundamental part of life. A person usually exercises power to accomplish his own goals which are established in terms of his long-run purposes. All of this

relates to the most intimate aspects of his personality, his motivations and his hierarchy of values. These are commonly learned more from informal and extracurricular personal interactions with parents, teachers, and fellow students than in the classroom. There is no indication that television or the computer or any other innovation of educational technology can in the foreseeable future substitute for this personal touch. Any educational system whose size or organizational arrangements can make such human contacts infrequent cannot accomplish one of its central missions. Anonymity is not the optimal climate for learning.

The individual student, somewhere in his education, must learn an economic approach to the planning of his life. He must learn to husband scarce resources--friends who can help him, his own time and money, and useful materials and services. He must learn that for every benefit there is a cost and that it is to his advantage to optimize the trade-offs of costs and benefits. This makes for efficiency of personal decision-making. Of course most human decisions are not calculated. Often their bases cannot be stated. But in actuality many personal decisions, especially major ones, involve cost-effectiveness evaluations. Education can develop a student's skills in making such evaluations.

Thus a student may be viewed as a living system, as can his parents, teachers, and the other individuals concerned in his education. Ordinarily all these are devoted to helping the student in his learning process. This is an altruistic goal which generally they all seek. But they are all human beings intent also on achieving their

personal purposes. Otherwise there would not be teachers unions; otherwise some parents would be more willing than they are to help their children with their homework. Anyone who wishes to understand education or any other social process must recognize that every human being tends to optimize his own purposes and these cannot all be altruistic. Fortunately for students, many of them are.

The Class or Tutorial Session

The fundamental educational process is face-to-face--the simplest form being the tutorial relationship of one teacher or counselor and one pupil, Mark Hopkins on one end of a log and the student on the other. More typically there are one teacher and 20 to 30 students, a classroom. The classroom is made of walls, floors, and ceilings, material artifacts. In and out of the classroom matter must flow--students, teachers, school books, other supplies--and so must energy--heat and light. These flows change over time. But the most important flows in a classroom are information flows--the information in the books, on the television sets, and in the interactions between the students and the teacher. These information transmissions are integral to the fundamental learning process. They also are the means whereby the teacher maintains discipline and coordinates the students who are components in the concrete living system which is the class.

The spatial structure of the class importantly influences its processes. If students are arranged at desks facing the blackboard or television set, their interactions are different than if they are arranged in a circle or if they are arranged at laboratory benches. The classroom process varies also with the content of the information discussed

and the teacher's approach to interpersonal reactions, which is often dictated by the teacher's philosophy of education.

Group learning situations differ in type: some are lecture sections, some discussions, some laboratories, some field trips, and some are extracurricular groups. The typical class is a face-to-face group and so it does not have echelons, but occasionally a large class organizes into echelons. The suprasystem of the class is an organization, the school, and its subsystem is the individual student or teacher.

Within the class there are many sorts of transmissions. Matter-energy such as laboratory equipment, experimental animals, or chemicals may be distributed to all the students. Information is processed when the teacher asks questions and the students respond, when the teacher writes problems on the blackboard and students solve them on their papers.

Also various sorts of steady states are maintained by the class. Ordinarily the teacher maintains the dominant control of these. With the help of the bell and the clock which signal the times for class periods, the teacher determines when the class begins and ends. The teacher usually divides the time available to the class more or less equally among the students, recognizing who is to speak, keeping the entire class in adjustment by quieting those students who speak out of turn,

Often the teacher varies the rate of information processing, sensitively reacting to signals in the students' expressions and comments which indicate how fast and well they are learning. A new topic is not taken up until most of the class have mastered the previous one.

Usually the teacher wields the primary power in the class, but often, as the students get older and enter the higher grades, this power is diminished. Sometimes students resolve conflicts among themselves, but often the teacher must step in as the decider in the group. The teacher is trained to understand the overall purposes of the course being taught and to set day-to-day and moment-to-moment goals to accomplish these purposes.

Of course there are significant costs in the functioning of any class. First there are the original capital fund costs of building the classroom. There are the operating fund costs of light, heat, supplies, and repairs. There are also the costs of recruiting, training, and equipping the teacher and of the information-processing media which bring information to the class. Besides the money spent there are also the costs in the human time which is consumed at the school. Since it is possible to evaluate at least roughly the effectiveness of a single hour in class or a single course, cost-effectiveness evaluations of a given class are possible.

What are the critical subsystems of the living system known as the class? The student who holds open the classroom door so others can enter is part of the ingestor. The teacher or child who distributes the graham crackers in kindergarten is part of the distributor. The laboratory assistant responsible for the stock of glassware and chemical reagents is part of the matter-energy storage subsystem. The student who opens the window when the class gets too hot is part of the extruder.

The information processing subsystems are more central to the main purposes of any educational group. The child who comes in and reports on his experiences over the weekend in "Show and Tell" is a component of

the input transducer. The girl who reports that the boy behind her is sticking her with a pencil is part of the internal transducer. The channel and net includes air through which the students talk as well as the examination papers they hand in to the teacher. Often the teacher alone is the decider, but at times some or all students may join with the teacher in this group process. The report from the teacher to the principal on how the class did that week is an output transducer function.

The School*

A school is generally a building or a set of buildings on some real estate, all together occupying physical space. This physical space is important because it limits expansion and restricts the size of auxiliary facilities such as football fields and playgrounds. Building a school alters arrangements in physical space, but it also changes the spaces of abstracted systems in which it is located. It becomes the locus of many community activities, such as the Parent-Teachers Association, which allow citizens to cooperate for the purpose of helping the school. It allows certain members of the community to exercise initiative and leadership and derive a variety of benefits from that kind of participation. It also becomes the center of a political unit for those persons who are concerned with financial and other support of that school. It affects real estate values in its immediate surroundings.

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* This section and the next are contributed by Dr. Gustave Rath, Professor of Industrial Engineering and Management Sciences, The Technological Institute, Northwestern University, Evanston, Illinois.

Time is a fundamental dimension in schools. In most of them a system of bells indicates the limits of class periods. The class programs and major activities are scheduled in terms of a school year calendar. One recent change in many schools has been flexible scheduling, based on the developments in individual classes. The availability of media, the use of CCTV and educational television (ETV) has added more flexibility to some aspects of school processes but more rigidity to others which are dependent on closed-circuit TV or ETV broadcasts. The more individualized instruction, such as dial-access systems, that is available, the more flexible can the scheduling and operation of the school be.

In some systems-oriented planning studies students' time has been considered the major consideration, and lack of more student time was viewed as a constraint on all activities that occur in the school.

Schools have matter-energy relationships similar to many other organizations. As any school principal knows, planning about matter-energy structures and processes comes first whenever any new school is being constructed. The architect decides how to arrange the walls, floors, and roof on the lot and the contractor constructs the building from those plans. Fuel is brought in to provide heat and electricity to provide light. There are inputs of water, food, equipment and other supplies and outputs of garbage and sewage. Over time students come and students go.

Information transactions, however, are the main business of a school. In addition to the direct information interactions which occur between teacher and student, the administration and operation of the

school as a whole require many types of information flows. Operational information is needed to coordinate and plan the educational process. Information is needed and collected for fiscal and administrative matters such as pupil attendance, which is a key factor in most school systems as a major portion of revenue depends on it. Payroll information must be collected. Additional information is necessary for scheduling of students, teachers, and facilities.

A school is a system whose components are classes in classrooms, administrators in offices, workers in storage areas, cooks and waitresses in cafeterias, and maintenance personnel throughout.

Schools are open systems into which resources and people come and from which students graduate and the other people leave after a period of time. The processes which a school purposes to bring about are irreversible learning processes. A school is in some ways like a job shop in which a series of students are processed from station to station, from one learning experience to another. The experiences are similar but not identical. Nor is their order and timing identical for each student. The student's behavioral and cognitive changes are the key determiner of the timing. Skipping grades and ungraded schools attest to this viewpoint.

A school is usually part of a school system which is its suprasystem. Generally its components are class and other learning groups.

All the variables in a school are never in steady state. Adjustment processes reacting to negative feedbacks are continuously active. Feedbacks occur within the school in many channels between the principal, the teachers, and the students, as well as the parents and the citizens

of the community. Many adjustment processes are required to keep the school operating under these many forces.

Power and conflict are critical problems in schools. In many of them today, power is chiefly wielded by the teachers. The principals are faced with the difficult position of being expected to resolve conflicts and bring about decisions to keep the system integrated which concern teachers over whom they have little control because of their tenure, teachers' unions, schoolwide curriculum decisions, and a suprasystem which makes the decisions allocating major resources. Often the principal feels that he is little more than the school's output transducer--a public relations man. Of course, in small schools, or independent ones, the principal or head master may be the key power figure. Conflicts also occur between outside and inside groups such as unions and faculties. Conflicts also occur inside schools between students and teachers. Interpersonal conflicts within the staff have always been with us.

The purposes and goals of a given school relate to the overall plan of its suprasystem, the school system. Individual schools are expected to apply their resources to maximize the educational objectives set forth by the school system. Typically these purposes and goals, of quite different sorts, may be divided into: (a) educational objectives, such as preparing a student for a vocational school, teaching vocational skills, preparing students for college; (b) social skills, such as good citizenship, developing good consumers and responsible citizens; (c) economic service objectives, such as keeping the students off the streets, babysitting for working mothers, and other such activities; and (d) community services, such as lighted schoolhouse programs, PTA's, educational programs in the evening, and the use of the physical plant by the community; also,

the offering of recreation and entertainment for the community in the form of sports, and, in some cases, other things like movies or plays.

Costs of a school include use or expenditure of scarce resources such as materials--foods, equipment, supplies; energy--light, heat, fuel; information--books, audiovisual aids; budgeted funds; human time of all personnel in the school and many in the community. When these are measured and compared with measures of achievement of purposes and goals, cost-effectiveness evaluation of a given school is at least roughly possible. Effectiveness can be measured in terms of the number of students who graduate, the number who go to college, the number who drop out, how well students do in competitive examinations, how well they do in getting and holding jobs, crime rates among students and graduates, and other measures of undesired social conditions among them such as narcotics addiction, ill health, and unemployment.

The critical subsystems of a school may include guards who protect and maintain the boundary; the admissions office whose personnel register new students and so are components of the ingestor; workmen who cart equipment to various rooms in the school, parts of the distributor; the cooks in the cafeteria, components of the decomposer and the producer; bookstore clerk, part of the matter-energy storage subsystem; and the janitor, a component of the extruder. As to the information processing subsystems, the technician who operates the ETV controls is a unit of the input transducer; the teachers and students all participate in the channel and net; the librarian is part of the memory; the principal and teachers jointly constitute the decider, with the principal more in control in some cases and the teachers more in control in others; and the principal is a major component of the output transducer.

The School System

The matter and energy of a school system include all that of the schools which are its subsystems. In addition there are school bus transportation facilities, warehousing and shipping facilities, and other services which use the roads of the community which is the suprasystem of the school system. Times takes a new perspective as compared with the school's time units of hours, weeks, and the school year. A school system works in terms of many years. A bond issue and a consequent commitment to buy land and build on it is a multiple-year activity. Planning-programming-budgeting (PPB) for school systems always requires a multiple year plan.

Information processing is essential if personnel, facilities, and allocated resources are to be kept under control and coordinated. Resource allocation and control is a major function of a school system. Individual schools require resources and generate the information flows that lead to more revenues. The school board with its ability to propose bond issues, to help determine tax levies and schedule campaigns, gets involves in many political processes in the decider subsystem of the community, which is the school board's suprasystem. All this must be coordinated by information flows into and out of the system.

The structure of a school system is much more complex than that of a school. Some decisions are centralized and others are decentralized. In very large systems, many hierarchical levels occur. The processes involved are those of planning, control, training, logistics, acquisition of educational materials, and development of common services to serve all components of the system.

The suprasystem is the community and above that the state including the state school board of education, which is usually a very weak system compared to a school system.

There are matter-energy flows of supplies and equipment and of persons to some extent among components of school systems. Primarily, however, such systems are parasitic (or symbiotic) upon their suprasystem communities for such flows. Information flows, usually over the community channel and net subsystem, are much more fundamental. They provide feedbacks and control signals which maintain the adjustment processes that keep components of the system in steady states. Information on votes and bond issues, levies, the effect of the press, and public sentiments about the school system is processed. It is interesting to note that recently many school systems have shown great interest and concern in public relations activity and in developing instruments to measure how they are viewed by the public.

Power and conflict problems are much greater at the school system level than at the school level. Power not only involves power within the school system, but also the suprasystem of the community in which a school system is embedded--city government, citizens' groups, real estate interests, and political organizations, among others.

The purposes of a school system are ordinarily viewed over a longer time span than purposes of a school. A time horizon of five years is minimal because it is the least that covers all those children who are alive and living in the community but are not in the school system. A time horizon of seven years is minimal for such planning as the decision to buy buses, because seven years is the average life of school buses. In a kindergarten through eighth grade school system, a nine-year predictive

span makes sense because that is the least that covers changes which will be implemented in the kindergarten and continue through into the eighth grade. Land buying commitments involve planning many years ahead, since bond issues and the public financing may take 20, 30, or 50 years to retire.

The purposes of the school system include the intention to give a high quality of education to all members of the community through programs which meet the individual needs of all, including special groups such as children with physical disabilities or learning disabilities, as well as an academic program for those who are going to college. This may be interpreted in specific goals like the operation of special education classes, an ETV station, or a junior college.

Cost-effectiveness evaluations are critical in school systems because a maximal possible level of expenditure exists at any given time, and the school system must achieve the optimal cost-benefit ratio for that level of resources. Thus, with a given budget, one tries to achieve the best possible programs. This is especially difficult as inflation, increasing salaries, and other pressures exert continuing financial pressures on the school system in spite of additional revenues. These forces may lead a school system to develop a PPB system. That makes it possible for alternatives to be presented for analysis to the school board in a way in which decisions can be made.

The critical subsystems of a school system include guards and community police that protect the boundary of its property. Warehouse personnel that receive shipments of equipment, components of its ingestor. Truckers who deliver such supplies to schools, parts of its distributor.

Persons who build or manufacture supplies, part of its converter and producer. Warehouse laborers, parts of its matter-energy storage. And bus drivers, components of its motor. Closer to the school system's primary purposes are the subsystems that process information, including: The administrators who bring back from national conventions reports on what other school systems are doing, components of the input transducer. Administrators who receive periodic reports from each school in the system, part of the internal transducer. Telephone operators, parts of the channel and net. Filing clerks, parts of the memory. The Board of Education and the superintendent, parts of the decider. And the president of the Board of Education, part of the output transducer.

The College

A college has as its territory the campus. Within its boundary are dotted clusters of matter which are its buildings. Into this campus enter many forms of living and nonliving matter--bricks and mortar, furniture, equipment, supplies, food, automobiles, bicycles. Also animals and human beings enter. And there are outputs of such things as well, many of them wastes. All these structural configurations and processes of input and output change over time. This change may be slow, for many colleges are traditional. They often endure a long time. Some European colleges are centuries old. Even in America Harvard College has lasted more than three centuries and Yale for nearly three.

As at all other levels of educational systems, the types of processes which are most important and characteristic and which chiefly accomplish their goals are the information processes. Information flows into a college from all over the world--by scholarly journals, books,

radio, television, the mails, but also by visiting scholars, students, and others who come there for varying lengths of time. There are many patterns of information communication and storage within the system. Interactions among students and faculty, learning by faculty and students, storage of memories in human beings and libraries, and publication of knowledge through books, broadcasts, and travel of professors and graduates to all parts of the world.

A college is a concrete living system with a structure usually clearly pictured in maps of the college. The process in that structure is often vigorous and always complex.

There are various types of colleges, classed by the content they study--e.g., general education, engineering, or law--by number of components, and by form of organization. The suprasystem of some colleges is a university. For independent colleges it is the community of which they are a part. The subsystems are departments, usually separated by academic disciplines, and other such components as student unions, fraternities, dormitories, and field stations.

The administration of the college, with the cooperation of many components, maintains a steady state relationship between the system and the suprasystem, through public releases, interrelations with the alumni, and citizens of the community. It also uses its power to maintain the appropriate adjustments between the students' demands for power and accomplisment, the faculty demands, and the demands of the other components in the total system. The administrators are a major aspect of the decider, which may often be dispersed to include others as well, and they make their

decisions in the light of many feedbacks which they receive from all parts of the system and its environment. Often, and especially in recent years, they find themselves involved in the resolutions of interpersonal and intergroup conflicts.

Some colleges, like a Jesuit seminary or a school of agriculture and mining, are quite clear about their purposes. Others, particularly those concerned with general education and the humanities, are less certain. Nevertheless, they appear to set goals which lead toward certain purposes, vaguely or clearly outlined.

Any faculty member or administrator of a college who has ever made a budget knows that all the college's processes involve costs in matter-energy, information, and time of the human beings involved. Consequently it is possible to make cost-effectiveness evaluations of how well the system is achieving its long-range purposes and its short-range goals. The measurement of effectiveness of such a system is by no means easy because the organization's purposes and goals are subtle. Much thought has been given to this problem of evaluation, however, and this effort has resulted in some progress.

It is not hard to identify the critical subsystems of a college. The police who guard it are involved in its boundary subsystem. Those who bring in the necessary books, supplies, fuel, and food are parts of its ingestor, and the drivers of the delivery trucks and porters who take it to all parts of its campus are components of its distributor. In closets, pantries, and bookstores it has matter-energy storage. The cooks, heating engineers, and carpenters are components of its converter and producer. The drivers of the trucks that remove the wastes are parts of the extruder. In the information processing subsystems the Dean of Admissions and the mail clerks are parts of the input transducer. The Dean of Student Affairs

does much of the internal transducing, learning how the students feel about various aspects of their college life. Both students and teachers are involved in learning and are components of the associator. The scholars and librarians are parts of the memory. The department chairmen, deans, and presidents help to make up the decider. The faculty who publish and go forth to lecture, as well as the alumni and the official spokesmen of the college, are components of the output transducer.

The University

Obviously a university is not fundamentally different from a college as a living system. It is usually larger, more variegated, more sophisticated. Because of their size and variety, as universities have grown from colleges they have developed more and more echelons. Some colleges have only department chairmen and a president. But long ago deans intervened over department chairmen, and in the last 20 to 30 years provosts, vice chancellors, chancellors, and vice presidents have also flourished. Academic structures have become much more complex with components, subcomponents, and subsubcomponents--colleges, departments, and units of departments, as well as institutes, centers, and intercollege programs.

As the systems have grown in size and complexity decision processes have been decentralized and the systems have demonstrated less integration. The major programs or components usually represent content areas or disciplines--categories of information processed--instead of functions, which components almost always represent in large industrial or governmental organizations. Although the boundaries of university departments at first are often set by subtle academic logic, and so surround abstracted systems, eventually the different components so separated grow into semi-autonomous concrete systems--groups of people.

Management information systems are being used for the first time in recent years to evaluate the cost and effectiveness of these programs. The costs are easier to determine than the effectiveness, but to some extent arbitrary criteria have been set up, like the national ratings of the quality of graduate departments, the number of their publications, or the number of their graduates who pass professional examinations. These measures, though subject to criticism and clearly unsophisticated, are first steps toward effectiveness evaluation.

The critical subsystems of universities are similar to those of colleges. The main difference is that the decider subsystem is much more decentralized.

The Nation's Educational System

Countries vary greatly in the structures of their components responsible for education. Education in most other nations is much more centralized than in the United States. Since the United States is a union of states that were established by colonies which formerly considered themselves to be sovereign, the educational activities of the country are primarily controlled by state and local governments. The components of the elementary, secondary, and higher education of the nation have been described above. The national educational system is simply the sum total of these plus the administrators who determine policy for it, like the Office of Education, acting as interfaces between it and the total nation.

The national educational system of the United States has few operating units beyond those mentioned above, with the exception of the

regional educational laboratories. Consequently the main emphasis in discussing this level of national educational system will concern how decisions are made in it. Day-to-day decisions in individual schools of course are made by its principal and teachers. Superintendents in schools and boards of education are probably the most autonomous decision-making units in elementary and secondary education, just as college and university administrators and boards of trustees are autonomous decision-making units in higher education. State superintendents of education, as we have said, have been relatively impotent so far, and until the last few years statewide controlling boards of higher education have not been powerful deciders, but the balance of power is rapidly changing from the colleges and universities to the administrators of statewide systems, including the governor and the legislature.

The United States Office of Education has been relatively impotent until this decade, but its decision-making power grew rapidly in the Kennedy and Johnson administrations. It is still much less influential in elementary and secondary education than the school systems, although the balance is changing. The fundamental influence in the Office of Education is through the funds it administers for building construction, educational subsidies, student loans, educational research, and educational technologies. As it gained this financial power the prestige of the national educational organization has increased dramatically. Through the networks of official communication channels and through professional conventions, local school boards and college boards of trustees are affected by national decision-makers. The granting processes of federal agencies and foundations have also become important aspects of the decision-making process. Now, for the first

time, it begins to be possible to plan such institutions as national resource centers to provide curricular materials for various media that can be used over national and international networks. When these begin to function, not only decision-making but also the educational process itself can become more centralized nationally.

The International Educational System

Except for the interchange of publications among nations and for Fulbright, Guggenheim, and other visiting fellowships and scholarships, the educational systems of the world's nations have been almost entirely independent of each other and still are. With the establishment of the League of Nations and more recently of the United Nations--and particularly with UNESCO related to the United Nations--worldwide planning for education has begun. Someday there may be an international or supranational educational system, but we are far from it at present. Educators are communicating regularly by publications and international congresses. The educational leaders of nations know each other and intercommunicate. The first steps have been taken toward the development of international textbooks and television lectures, and the setting up by satellites of international networks interconnecting the national educational systems of the world. There will undoubtedly be rapid development of these technologies and consequently of the decision-making processes required to coordinate these. As of now, however, the international educational system is not a true system since there is no effective central decider. There are only vestiges which may sometime grow into a potent means for teaching the citizens of the world and hopefully aiding them in living together in harmony.